

FINAL REPORT

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**BIOTECHNOLOGY HUMAN RESOURCE DEVELOPMENT
PROGRAM**

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Prepared by: Sask Institute of Applied Science & Technology



Canada¹

Saskatchewan

Annual Report on the Biotechnology Program

***Human Resource Development Project
(96000270)***

SIAST Kelsey Campus, Saskatoon

Submitted to the

Canada-Saskatchewan Agri-Food

Innovation Fund Secretariat

By

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Biotechnology Program

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SUMMARY

The objective of the Biotechnology Human Resources Development project is to upgrade the old Biological Sciences Technology Program to produce technicians who are qualified to work in the Ag-Biotech sector in addition to their more traditional laboratory positions. In order to accomplish this we required a revised curriculum; upgrading of instructors to teach a Molecular Biology course along with laboratory space, equipment, materials and supplies to run this course. We also needed to replace two growth chambers and add computer-enhanced training to use teaching modules available on CD-ROM. Funding from the AFIF grant will shorten our completion time by 15 years.

TECHNICAL REPORT

Background and Objectives:

The old Biological Sciences Technology (BST) Program was entering its 25th year of existence as a basic training program for laboratory technicians for the scientific research and development community in Saskatchewan. In 1993 there was increasing pressure from the burgeoning agricultural biotechnology sector and our Advisory Committee to upgrade the training our students were receiving so that they could enter their laboratories without the need for extensive post-graduate training especially in the area of molecular biology.

In order to meet these demands we needed to upgrade the instructors' knowledge base; revise program curriculum, with extensive consultation with industry, to produce a program capable of awarding a credible Biotechnology Diploma; expand our program equipment, materials and supply base and laboratory space to accommodate the Molecular Biology course; replace worn-out growth chambers for the plant courses; purchase additional equipment for the biochemical laboratories; purchase computers and software for a student laboratory; and develop promotional materials to advertise the new Biotechnology Program.

Project Activities, Achievements, Outline of Course Materials:

We are coming to the end of the capital purchases for the Molecular Biology Laboratory. We have been given permission by SIAST to top up the remainder of the funds for this year to purchase a digital camera system to take pictures of gels produced. We will also be able to use the camera in many other courses to produce slides of educational materials.

We are in the final stages of preparation in our attempt to become the first nationally accredited Biotechnology Program by the Canadian Technology Accreditation Board (CTAB).

We have entered into discussion with both the Universities of Regina and Saskatchewan to have our diploma graduates ladder into degree programs.

Results and Conclusions:

The Biotechnology Program will continue to evolve to meet its goal of producing an adequately trained technical workforce for the Ag-Biotech sector. We are confident that our graduates comfortably meet the requirements of entry level technicians in the traditional and biotech sectors. We are excited about proceeding with national accreditation. We have begun discussions with the Universities of Regina and Saskatchewan on the possibility of getting two years of University credit for the Biotechnology Program allowing our graduates the opportunity to complete a University degree in 2 years after their Biotech diploma. Many employers have suggested that this would be a very attractive job candidate for their companies as they would like to have technicians that are multiskilled and well developed critical thinkers. From the graduates perspective this would mean an increase in pay and the possibility of advancement into supervisory positions and of course further advancements in career and educational opportunities. We see this as a very positive step in enhancing the human resource requirements of the Biotechnology sector.

Further Development:

With the opening of the new CLS Synchrotron, and the plan to apply for national accreditation status, there is a need to apply for additional funding to purchase four widely used and expensive pieces of instrumentation. To that end we are making application for an SIF grant from the government of Saskatchewan to purchase a GC-Mass Spectrometer, X-ray Fluorescent Spectrometer, Nuclear Magnetic Resonance Spectrometer and a ICP Emission Spectrometer.

Being able to train our students on this instrumentation will make us the premier training centre for Biotechnology and Chemical Technology laboratory technologists in Western Canada.

Performance Indicators and Deliverable:

While the job prospects for this sector are good (Appendix II), attracting qualified applicants and student preparedness and retention remain major problems for this program. For the 1999-2000 intake of 25 we expect to graduate 18 technicians in the year 2001. This information is outlined in Appendix III. Many of the students have outside family pressures, being married or single parents, and find it extremely difficult to balance home, school and sometimes work at the same time. Kelsey tries to accommodate their needs by offering reduced course loads and tutoring, yet some will still fail out or discontinue. The increased demand by employers for highly-skilled, specifically-trained technicians is sometimes at odds with a two-year technical program given our financial constraints, cost of maintaining and updating expensive capital equipment, upgrading instructors' knowledge base, and a limited student applicant pool with weak science and math backgrounds. SIAST is considering implementing mandatory pre-technology testing and upgrading courses for students with a demonstrated weakness in these areas. We are raising the entrance requirements from a minimum 60% to 65% overall Grade 12 average with 65% required in Biology 30, Chemistry 30, English 30 A and B and Math A30. These entrance requirements will be applied for the 2001-02 intake.

SIAST is also moving to a continuous application system, placing qualified applicants on a waitlist for the next intake period. SIAST will be attempting to attract qualified applicants from out-of-province to increase the applicant pool.

Formal industry feedback on the program is monitored through the Advisory Committee and supervisor feedback from practicum placements. The Advisory Committee met October 31, 2000. The agenda and minutes of the last meeting are included in Appendix IV.

Facilities problems are mostly associated with a shortage of laboratory space in the Molecular Biology Lab. While the laboratory has doubled in size from the original, the rapid influx of new equipment is leaving us somewhat cramped. Unfortunately, there is no capability for expansion in the near future. The equipment that has been purchased so far is in good working order.

Increased knowledge for the human resource base includes molecular biology, bioinformatics, bioethics and quality assurance. Our graduates are employed throughout the biotech industry. They are better received in some areas than others. We still have employers who believe University graduates are better prepared for the workforce than SIAST graduates. We are going to try and address this issue by facilitating the ability of SIAST Biotechnology graduates to complete a University degree in 2 years in Saskatoon or Regina after their SIAST diploma. We see this as a major benefit to all parties. The technical graduates will be able to enter the workforce with a broader background, help feed the University system, and meet the need for technologists having a diploma and degree.

Before the impact of the biotech industry was felt in Saskatchewan the Biological Sciences Technology Program was struggling and even targeted to be phased-out. The program was producing small numbers of good, basically-trained technicians for the standard industries associated with agriculture and food processing but the curriculum hadn't been reviewed for 20 years and the technologies of the new biotech industry were different and expensive. Our action plan was to revamp the curriculum, including training instructors for the new Molecular Biology course, update the plant courses, ensure the chemistry courses were geared toward the analyses and instrumentation currently used in industry and somehow over the next 20 years to purchase a piece of equipment or two to help support the Molecular Biology course we hoped to have one day. With a limited capital equipment budget for all of SIAST, it is not possible to concentrate on just one program and ignore the other 100 or so programs at all four campuses. The AFIF grant has meant that we will have completed these changes by the year 2000. It means the biotech industry has ready access to highly skilled technicians at their doorstep. And can even be credited with our diploma graduates getting a full 2 years transfer credit toward a four-year degree.

Expenses are listed in Appendix Ia and Ib. All expenses to date are for materials, supplies and cartage. Copies of the purchase orders are found at the end of the appendices.

Project photos were taken of the Molecular Biology laboratory by Mr. Kevin Hursh for the "Innovation Report" in 1997. There are no other photos of this project. I have print copies of these photos, which are available upon your request. Mr. Hursh may have 35-mm slides.

The Innovation Fund was acknowledged in an initial press release by SIAST, on our web site (<http://www.siastr.sk.ca>) in the "Innovation Report"; and in my Program Head's Report to the Advisory Committee.

Public information materials developed with the AFIF grant to date include the Biotechnology Program web site and the Biotechnology Program brochure. Grant money was used to pay for the advertising of the Biotech Program in Education International's Canadian Guide to Science Programs.